

## Improving oral presentation skills of engineering students with the *Virtual-i Presenter (ViP)* program

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**Abstract:** *The growing size of engineering classes is impacting on the ability for students to acquire oral presentation skills. A unique program called the Virtual-i Presenter (ViP) was developed to allow students to create, view, and evaluate oral presentations using a PC and webcam outside of class time. The program is simple to use and recreates how a student would deliver an oral presentation in class. ViP helps students improve their oral skills by permitting them to see and hear themselves, practice repeatedly, and obtain feedback from peers and academics through an inbuilt evaluation system upon submitting their final presentation. Selected parts of presentations can also be viewed and discussed in class to address technical merits and key presentation skills. Student surveys on using ViP showed presentations were practiced an average of 4 times and 63% of students preferred short ViP presentations to live ones.*

### Introduction

Future engineering graduates are faced with solving increasingly interdisciplinary and complex technical problems in a competitive world that requires clear communication and presentation skills. To this effect, professional skills should be considered an integral part of an engineers formal education and are currently required under recently updated professional guidelines such as those provided by the Institution of Professional Engineers New Zealand (IPENZ) and the U.S. Accreditation Board for Engineering and Technology (ABET). Felder and Brent (2003) highlight that the ability to communicate effectively is a professional skill that all engineers should possess as presented in Criterion 3 of the 2003 revised ABET accreditation criteria. This skill can best be achieved through practice and feedback of oral presentations. Furthermore, Oberst and Jones (2004) mention that the use of communications and instructional technology is one of the major trends that affect the practice of engineering and necessitate the acquisition of skills beyond technical skills.

Many institutions are currently experiencing a growing interest in engineering disciplines which is translating to larger classroom sizes. Unfortunately, the growing size of engineering classes at all levels is impacting on the ability for students to acquire oral presentation skills. For example, in the department of Civil and Natural Resources engineering at the University of Canterbury, class numbers for the 1<sup>st</sup> and 2<sup>nd</sup> professional years surpass 160 and few lecturers are able (or willing) to allocate lecture, tutorial, or lab time for students to practice and deliver oral presentations. Even in the final year, with some class numbers increasing sharply, it is becoming impractical to allocate time for oral presentations of individual projects. In classes such as Hydrology, group project reports and oral presentations of these projects have traditionally been a highlight of the course. However, with class sizes approaching 80 students, 4 lecture hours are required for students to present 8 minute oral presentations in groups of 4. The perspective of doing this in the future becomes less and less appealing as oral presentations take over limited lecture and lab time which is needed to cover other

critical technical material, and thus, due to lack of practice, engineering student oral communication skills suffer.

In some engineering disciplines, where final year projects are not a requirement, students can go through their academic career without having the opportunity to give an oral presentation. In other cases, if they do have the opportunity to give an oral presentation for their final year project, they do a poor job of it because of lack of previous experience.

To tackle this problem and improve presentation skills, we developed a prototype program called *Virtual-i Presenter (ViP)*. ViP allows students to create, review and evaluate oral presentations using a webcam and a powerpoint presentation. The program is simple to use and allows students to practice and improve their oral presentation skills outside of classroom and still receive peer and academic feedback. ViP can be used to prepare students for oral presentations earlier in their academic careers and allow them to do a better job when given an opportunity to present live. Although commercial software exist to create digital videos using webcams and powerpoint (Camtasia Studio, and others), ViP was specifically designed for creating, practicing, and evaluating presentations with the following features:

- a) No video or audio editing capabilities. Most commercial software enables the user to edit video, including clipping, joining, and formatting video and audio. Editing video/audio is contrary to the premise of helping the user improve oral presentation skills. Without editing capabilities, the presentation becomes closer to how live presentations are given.
- b) A system to evaluate presentations, enabling the presenter to receive both technical and presentation skills feedback.
- c) A simple and user friendly interface for the exclusive purpose of creating and viewing oral presentations without any other distracting features.
- d) Low cost (commercial software for video creating can costs over \$300 per licence).

No commercially available software was found that met all the above requirements.

## Development of the Virtual-i Presenter (ViP)

The ViP program integrates a powerpoint presentation with a digital video recording of the presenter (captured by a webcam) and recreates how a student would deliver an oral presentation in class. The ViP does not allow editing of the video or powerpoint, but does allow the student to practice the presentation over and over until they are content with it. The final version of the presentation is submitted and can then be viewed and evaluated by other class members and the lecturer. The evaluation allows the presenter (student) to obtain feedback on their oral presentation skills and on the technical merits of the material presented.

ViP was programmed in object oriented MS Visual Basic dotNET. It requires a PC with Powerpoint 2003 installed, a webcam, and microphones/speakers. The webcam is automatically detected by the software. The graphical user interface was programmed to be as simple and user friendly as possible.

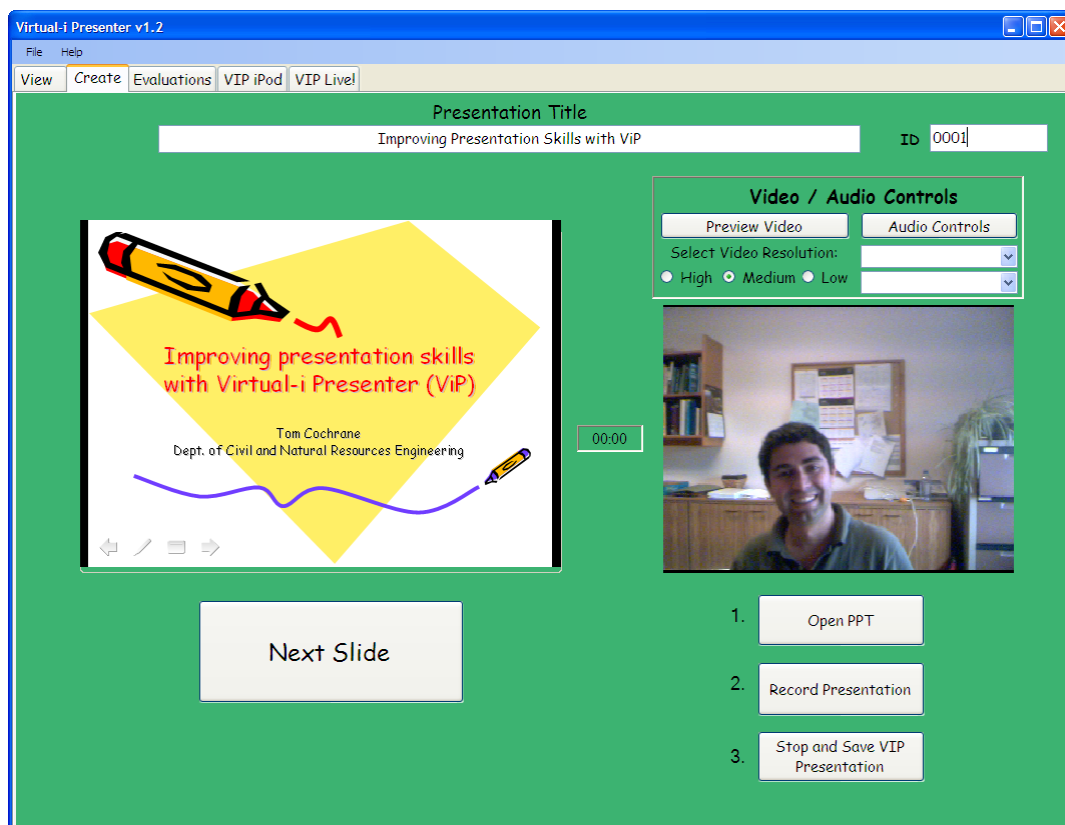
To create a ViP presentation, the user starts the ViP program and clicks on the program's create tab (Figure 1). The user then sets a desired video resolution, checks the audio, and previews the video screen. The webcam can be moved to satisfy an adequate coverage of the presenter and a title and Id number for the presentation can also be typed in. Three buttons at the bottom right of the screen are used to create the ViP:

1. Open PPT: This button is used to open the desired powerpoint presentation from any folder within the users computer. The powerpoint presentation is shown in the screen to the left (Figure 1 shows a presentation on "Improving presentation skills....").
2. Record Presentation: This button is pressed when the user is ready to start the oral presentation. The program prompts the user for a file name to store the ViP presentation. The

video and sound are recorded together with the currently displayed powerpoint slide. The user clicks the “Next Slide” button to move to the next powerpoint slide.

3. Stop and Save ViP presentation: This button is pressed to stop and save the ViP presentation when the presenter has finished.

To view a previously created ViP presentation, the user clicks on the program's view tab (Figure 2) and presses the “Open ViP presentation” button. The user is prompted for the ViP file name. The presentation title, Id, powerpoint, and video are then displayed. The video and the powerpoint slides are synchronized and the viewer has the ability to Pause, Stop, Play, and change the volume and balance of the presentation. At the bottom of the view screen, the viewer can evaluate the presentation and save the evaluation to a file, which can later be sent to the course lecturer or to the actual presenter. The evaluation form shown in Figure 2 consists of assigning a mark from 0 to 5 for technical content, presentation clarity, misc. marks, and the ability to write specific comments in the comment box. The evaluation forms can be modified for other presentations or purposes.



**Figure 1: ViP screen for creating an oral presentation featuring a powerpoint slide presentation and streaming video from a webcam.**

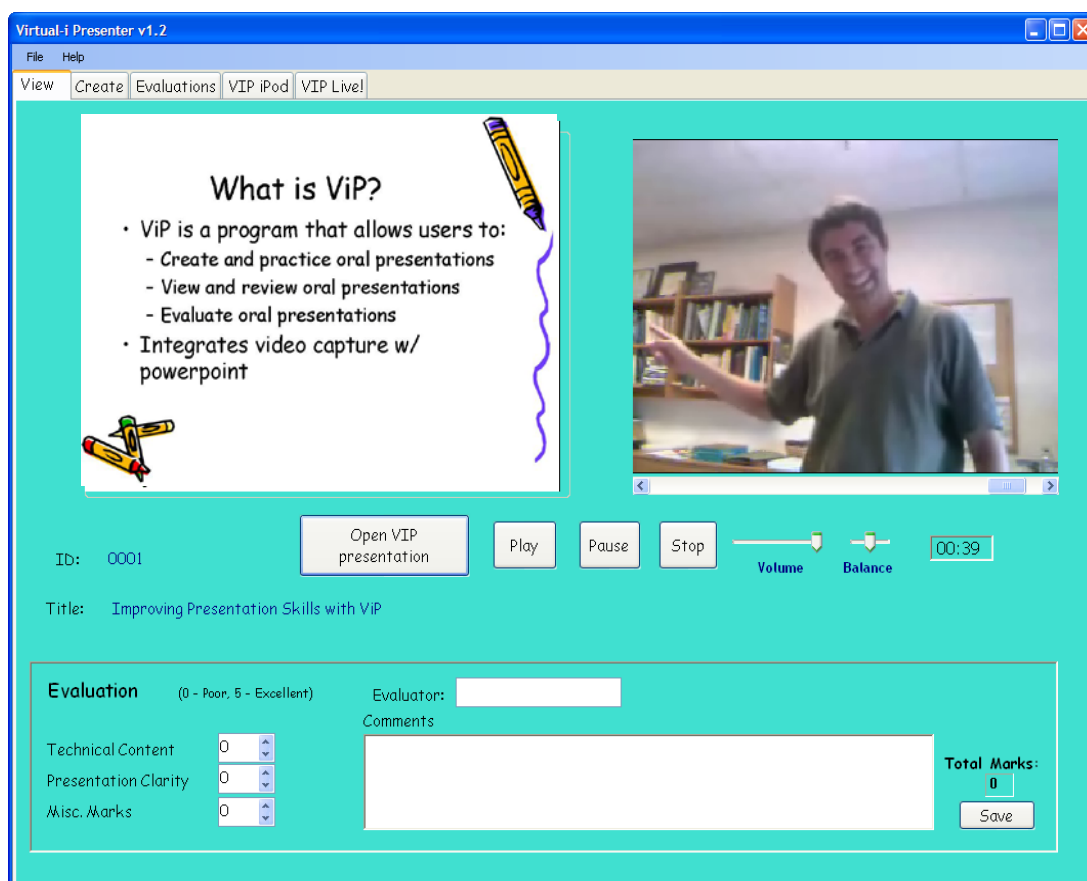


Figure 2: ViP screen for viewing and evaluating a previously created ViP presentation.

## Discussion of ViP example application and feedback

ViP was successfully tested on an initial group of 19 natural resources engineering students in their third year of studies. The students were divided into 10 groups (9 groups of 2 students and one individual) and were required to choose an Environmental Impact Assessment report from a list of large national project reports. They were then asked to write a critical review and create a 6 minute oral presentation using ViP which included i) project identification and purpose, ii) status of the project now, and when the report was prepared, iii) main environmental impacts foreseen, iv) whether the assessment conformed to 4<sup>th</sup> Schedule Resource Management Act requirements, and v) their own views of the project and its environmental impact. The assignment was worth 10% of their grade with 5 for the written review and 5 for the oral presentation. The oral presentation was evaluated by both peers and the lecturer. Evaluations for all presentations are collected digitally by the lecturer using the ViP evaluation system and a summarized feedback report was given to each presenter. At the end of the class, students were given a survey to provide written individual feedback on the use of ViP.

Students were given a brief 10 minute tutorial on using ViP in class. They were provided with the ViP program for installation on their laptops, webcams and microphones were available for loan, and a small computer room was set up with webcams, microphones/speakers, and the ViP software installed on desktops. Seven out of 10 groups create their ViP presentations in the designated computer room and 3 groups created ViP presentations on their laptops. All groups were able to create and submit their presentations on time.

There was a wide range in the quality of oral presentations. However, the general format adopted by students who did their presentations in the computer room was to present while sitting down and showing both group members on screen. For some of the weaker presentations, students resorted to reading text and avoiding eye contact with the camera. The most successful presentations as evaluated by the lecturer and students were the ones in which presenters stood up, were individually focused in

the video, didn't read, had good eye contact, smiled, and used appropriate humour. The quality of the oral presentation also seemed to be linked to the clarity of the powerpoint slides. Good oral presentations usually had clear and simple slides and made appropriate use of graphics or photos. The more ingenious presentations were done on laptops with outdoor backgrounds.

During class time, excerpts from selected presentations were projected on a large screen. A productive learning atmosphere was created in class, feedback was positive, and students enjoy watching and discussing parts of each others presentations. The ability for the lecturer to guide the discussion on selected portions of ViP presentations was something unique that wasn't possible in pervious years with live presentations.

Written surveys on ViP usage were provided by 15 students. Fourteen students out of 15 reported that they had no previous experience making videos. Thirty seven percent of students commented that they preferred to give live presentations and 63% reported that they would rather do ViP presentations. Students repeated their presentations an average of 4.33 times before submitting their final one (Table 1). Repeating the presentation 4.33 times for a single assignment is a significant number, because most of our Civil students will do less than 4 oral presentations during their academic career. The survey also shows that a slightly longer time was spent making powerpoint slides than recording the presentation. Informal feedback from students suggests that many groups improved their powerpoint presentations as a result of observing their first couple practice oral presentations.

**Table 1: Selected survey question results.**

Survey questions	Average (St. dev.)
# of times presentation was recorded before submitting final ViP	4.33 (2.35)
length of time (hours) preparing powerpoint slides	2.03 (0.88)
length of time (hours) recording presentations with ViP	1.73 (0.86)

The main technical difficulties reported were on enabling the microphone and setting up the program on laptops. Those students that preferred live presentations reported the greatest trouble with technical issues (microphone or laptop setup). When asked if they would like to have lectures using ViP, most students reported that they would prefer live lectures, but that tutorials or other material in ViP would be welcome.

Students reported that the best part of using ViP was the interaction between students while creating ViP's, being fun and amusing to use, practicing, and not doing it live. The worst part of working with ViP was reported as redoing the video when they made errors, not being able to edit the presentations with ViP, and technical issues (microphone malfunction, installation).

Magin and Helmore (2001) argued that by involving the audience of students in the task of assessment we can achieve two goals: a) foster skills of professional judgment, and b) improving reliabilities in assessing presentation scores. The evaluation process using ViP seemed to achieve both of these. Students were required to evaluate their peer oral presentations as we would normally do in live class presentations; however, with ViP they did this during their own time and thus we obtained close to a 100% turnout on evaluations and scores were close to ones given by the lecturer. Peer evaluation scores were averaged with the lecturer score.

## Future Developments and Conclusions

Apart from minor technical difficulties involving audio and installation (which are being resolved in the current software version), the student's experience with ViP was positive. The program allowed students to practice and review presentations as well as obtain feedback from peers and academics

through the evaluation process. Furthermore, by students being able to “see and hear” themselves present, it made them aware of their oral skills or fallacies and motivated them to enhance presentation skills by practicing more. Live presentations can not and should not be substituted fully; however, ViP enables students to become better prepared for when they have a chance to give a live presentation.

Following the successful outcome of implementing ViP in a small class, ViP will now be used on a large class of 75+ students. In large classes assigning lecture time for oral presentation becomes unfeasible, and thus the use of ViP becomes more important as it allows students to improve presentation skills where otherwise they wouldn't get a chance to do so.

ViP applications are not restricted to undergraduate students. ViP can be used by postgraduate students to enhance oral presentation skills for defending a thesis or presenting a paper at a conference. Lecturers can use it to enhance presentation skills or to provide students with special tutorials outside of class time. ViP applications are also envisioned in industry and research. Future ViP improvements include a feature to save presentations for viewing in iPods (mobile devices), improved evaluation forms with web database compatibility, and live web based ViP presentations.

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